

CROCODYLUS POROSUS FROM THE PLIOCENE ALLINGHAM  
FORMATION OF NORTH QUEENSLAND.  
RESULTS OF THE RAY E. LEMLEY EXPEDITIONS, PART 5

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ABSTRACT

An incomplete crocodylian snout from the Bluff Downs local fauna of the Allingham Formation of northern Queensland is identified as *Crocodylus porosus*. The Allingham Formation is, at the latest, of early Pliocene age and this specimen is the oldest attributable to *C. porosus*. It indicates that *C. porosus* has been present in Australia for at least 4 million years, and is one of the oldest known of living crocodylian species.

Whilst collecting material from the Allingham Formation of northern Queensland (Archer and Wade 1976) in 1975, M. Archer uncovered a fragmentary crocodylian snout. The base of the Nulla basalt, which overlies the Allingham, is dated as 4.0 to 4.5 million years old (Wyatt and Webb 1970), and hence the Allingham is at least that old. Thus this snout represents a crocodile of early Pliocene age.

The specimen shows no significant differences from modern *Crocodylus porosus* of comparable size, and hence its early Pliocene age is of interest. *C. porosus* has been reported from the Pleistocene (e.g. Lydekker 1888, Deraniyagala 1958), and whilst the *Zoological Record* (1970) reports *C. porosus* from the Miocene of Alcoota, central Australia, this is based on a specimen formally described as *Crocodylus* sp., which is clearly not referable to *C. porosus* (Woodburne 1967). Thus the Allingham specimen represents the oldest occurrence of *C. porosus*.

Material referable to several living mammal species dates into the Pliocene (e.g. Kurten 1968, 1972), but only one living crocodylian species known to me, *Gavialis gangeticus*, is represented by pre-Pleistocene material (Steel 1973). Thus the Allingham crocodile is also of interest as indicating that a second living crocodylian species dates from the Pliocene.

The Bluff Downs local fauna (from the Allingham Formation) contains considerable crocodylian material, mostly teeth, as well as remains of other reptiles, mammals and birds (Archer in Archer and Wade 1976), and

apparently sampled an environment including temporary water bodies. The snout was discovered in the main quarry, in bed b of section 2 or the type section of the Allingham Formation. This section is figured by Archer and Wade (1976, figs. 1B, 2).

DESCRIPTION

The specimen (Queensland Museum F9229) comprises the right premaxilla (nearly complete), the incomplete left premaxilla, and the anterior two-thirds of the right maxilla. The palatal portions of both premaxillae and maxilla are less complete than the dorsal portions. Three teeth are present. The plates clearly portray the appearance and form of the specimen so the description will not be exhaustive but will be restricted to those features useful in establishing the taxonomic assignment of the specimen.

**PREMAXILLA:** The right premaxilla is almost complete dorsally but lacks the palatal portion bounding and posterior to the incisive foramen; the left is less complete. Five alveoli are present in the right premaxilla, and a foramen for the first mandibular tooth. The constriction (maxillary-premaxillary notch) posterior to the last premaxillary alveolus is abrupt and marked. The posterior process of the premaxilla is broad.

**MAXILLA:** The right maxilla is broken posteriorly at the ninth alveolus, and is complete dorsally to the nasal and premaxillary contacts.

Most of the palatal process, however, has been lost. The delicate internal partitions are absent. A pronounced swelling is present over the root of the fifth tooth, as is common in crocodylids, and the maxilla is expanded laterally at this alveolus. The sculpture of the dorsal surface is less developed than in modern *Crocodylus* skulls of comparable size. At its nasal margin the maxilla is slightly upturned, suggesting the presence of the median ridge characteristic of *Crocodylus porosus*.

**TEETH:** Preserved are the fourth left premaxillary, and the fifth and eighth right maxillary teeth in situ. The former two are round in cross-section, whilst the eighth maxillary exhibits some lateral compression. All three teeth show marked anterior and posterior carinae and ridging (or fluting) of the crowns. They differ in no features from those of *C. porosus* or *C. novaeguineae* of comparable size.

#### COMPARISON

Comparison will be carried out first with Plio-Pleistocene crocodylians now extinct, and then with modern crocodylians of the Queensland region. The two now extinct crocodylians are the Pliocene or Pleistocene *Crocodylus nathani* (Longman 1924) and the Pliocene *Pallimnarchus pollens* (de Vis 1885). Unfortunately the type material of *C. nathani* does not include any portion of the snout, and so is not directly comparable to F9229. Comparison of the type material with material of *C. porosus* reveals no significant differences between *C. nathani* and *C. porosus*.

The material ascribed to *Pallimnarchus pollens* by de Vis (1885) contains little comparable with F9229, only a left premaxilla, and so comparison will also be made with the snout from 'Lansdowne' assigned to this species by Longman (1925). As pointed out by Longman, the premaxillae of that specimen differ in no significant features from the premaxilla included in the type. Comparison of the type premaxilla with F9229, reveals many differences, almost all of which can reasonably be attributed to the difference in size between the two specimens. Comparison of the type, F9229, the 'Lansdowne' snout, and a large *C. porosus* suggests that F9229 (and *C. porosus*) differ from the type of *P. pollens* in that the latter has a recess for accommodation of the first dentary tooth just posterior to the second premaxillary alveolus. F9229, *C. porosus* and *C. novaeguineae* have such a recess between the first and second premaxillary alveoli. In the 'Lansdowne' premaxilla this recess is immediately posterior to the second premaxil-

lary alveolus (Longman 1925) as in the type premaxilla of *P. pollens*.

A second difference of F9229 from the 'Lansdowne' snout, probably unrelated to the difference in size, is that in the 'Lansdowne' specimen the fourth maxillary tooth is the largest in the tooth row (Longman 1925). In F9229, as in both *C. novaeguineae* and *C. porosus*, the fifth maxillary tooth is the largest. These features suggest that F9229 is not referable to *Pallimnarchus*.

Of the two modern crocodiles that inhabit Queensland, *Crocodylus porosus* and *C. johnstoni*, the latter is a narrow-snouted form obviously distinct from F9229. In addition to comparison with *C. porosus*, however, comparison has also been made with *Crocodylus novaeguineae*. This is appropriate because of the proximity of Niu Gini to Queensland, and also because the *Crocodylus* sp. from the Miocene Alcoota local fauna (Northern Territory) has some similarity to *C. novaeguineae* (Woodburne 1967).

Comparisons were made with modern crocodile skulls that ranged in size from that of F9229 to about 30 percent larger in linear dimensions. This choice of skulls restricted the sample available, but eliminated the necessity for consideration of allometric effects. Three skulls of *Crocodylus porosus* were used (University of New South Wales, School of Zoology teaching collection (unnumbered), and QM J14478 and J29021) and one of *C. novaeguineae* (QM J5332).

In the region of the snout *Crocodylus porosus* differs from *C. novaeguineae* in five features (Schmidt 1928, 1932): the presence of a median (nasal) ridge in *C. porosus*; a marked groove on the dorsal surface of the maxilla just lateral to the nasal contact in *C. novaeguineae*; a slender posterior premaxillary process in *C. novaeguineae*; five premaxillary teeth in *C. novaeguineae*, and four to five in *C. porosus*; and a more pronounced maxillary-premaxillary notch in *C. porosus* than in *C. novaeguineae*. Taking these in order; the slight upturning of the medial margin of the maxilla of F9229 suggests the presence of a nasal ridge as in *C. porosus*, but does not demonstrate it. On the other hand, a maxillary groove like that of *C. novaeguineae* is clearly absent in F9229, and the posterior process of the premaxilla is as broad as in *C. porosus*. Five premaxillary alveoli are present in F9229, and the premaxillary-maxillary notch is not only more pronounced than in *C. novaeguineae*, but also more pronounced than in the specimens of *C. porosus* available to me.

Thus, of the five features, two are not helpful whilst the other three suggest attribution to the

species *C. porosus*. None resemble the characters of *C. novaeguineae*. It may be concluded that the Allingham crocodile, F9229, represents the earliest material of *Crocodylus porosus*, and that this species has been present in Australia at least since the early Pliocene.

#### DISCUSSION

The Allingham locality is just west of Emu Valley homestead, which is about 120 kilometres from the coast, and a much longer distance up the Burdekin River and Allingham Creek. This is rather far upstream for a crocodile often thought to be estuarine. It has been noted, however, that *Crocodylus porosus* often travels some distance up rivers (Neill 1971) definitely up to the first major waterfall or barrier (G. W. Webb, pers. comm., 1978). 'Bluff Downs' however is well upstream of the first waterfall, and suggests that either the Pliocene geography had less relief than the present, or that *C. porosus* navigated well beyond the waterfalls.

#### ACKNOWLEDGMENTS

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PLATE I

The Allingham and modern crocodile skulls in lateral aspect.

A: *Crocodylus novaeguineae*

B: The Allingham crocodile

C: *Crocodylus porosus*

Line represents 5 cm.

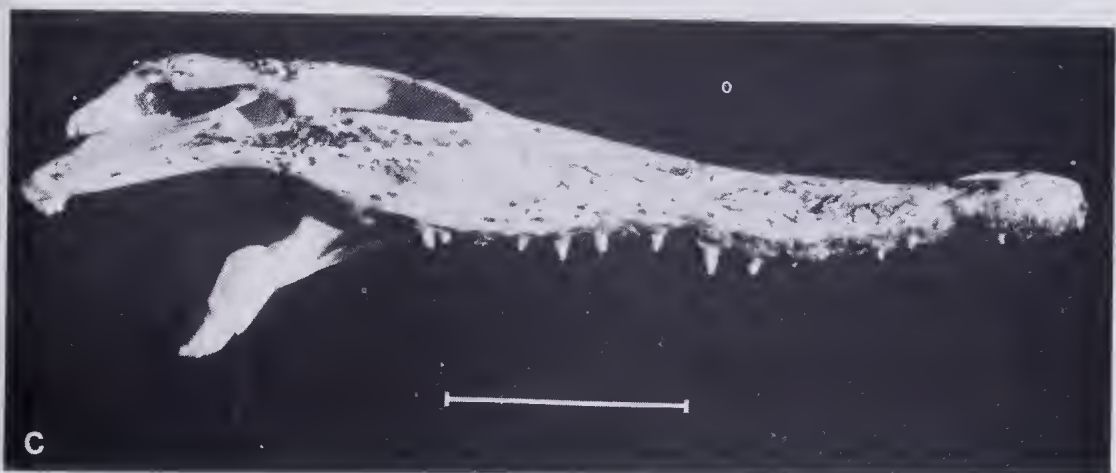
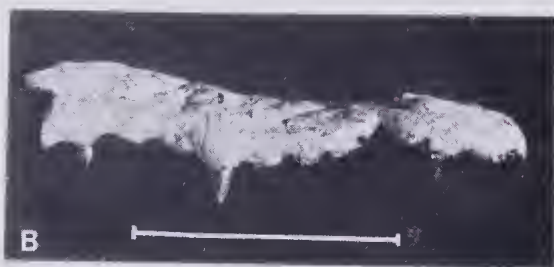
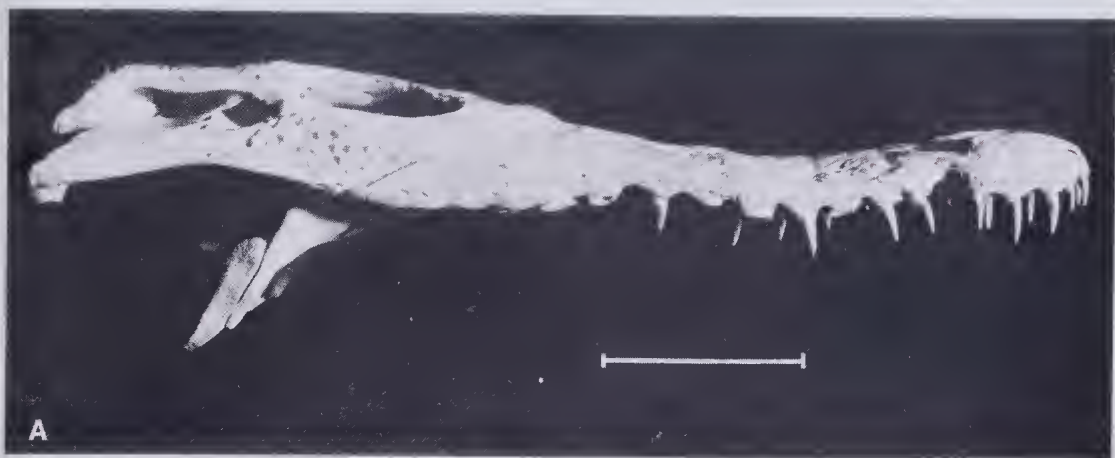


PLATE 2

The Allingham and modern crocodile skulls in palatal aspect.

A: *Crocodylus novaeguineae*

B: The Allingham crocodile

C: *Crocodylus porosus*

Line represents 5 cm.

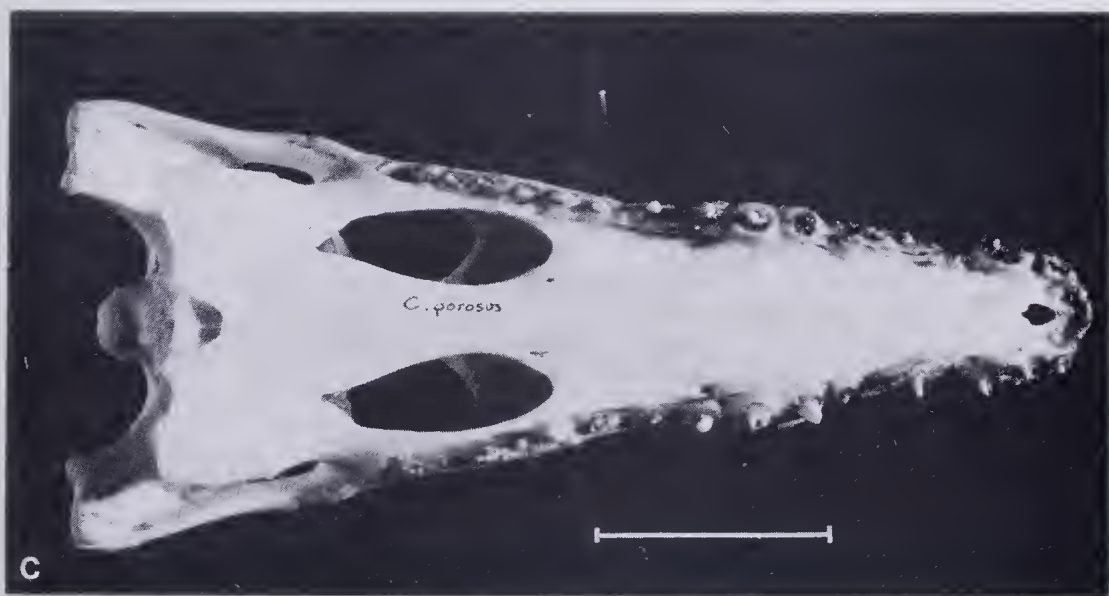
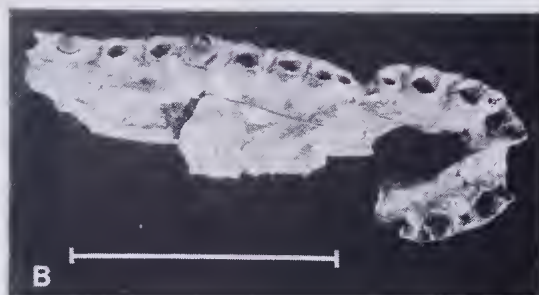
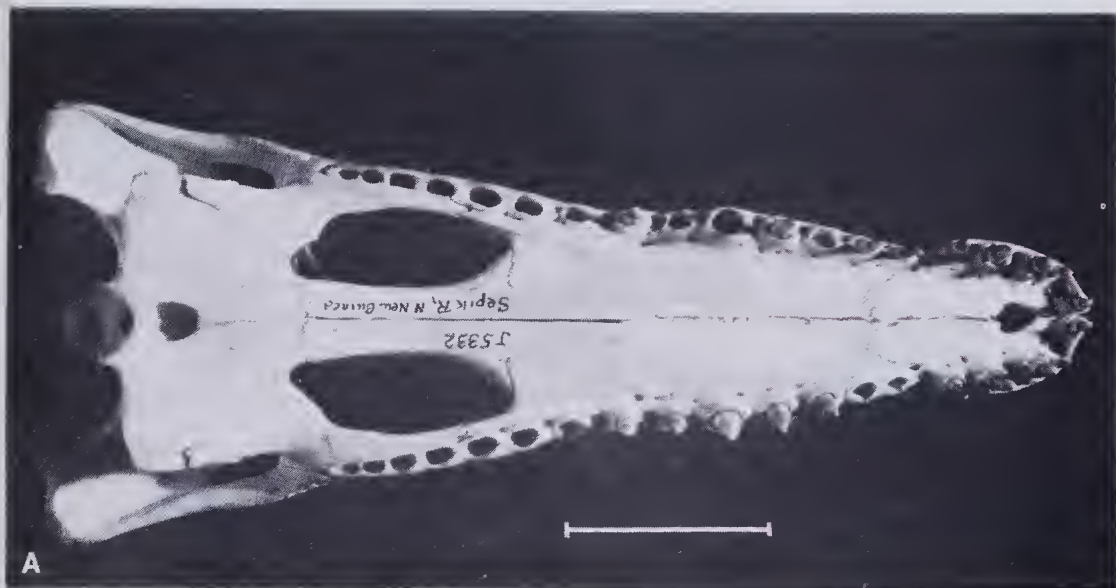


PLATE 3

The Allingham and modern crocodile skulls in dorsal aspect.

A: *Crocodylus novaeguineae*

B: The Allingham crocodile

C: *Crocodylus porosus*

Line represents 5 cm.



